Sodium Phytate
Sodium Phytate is a High Value Added Ingredient

High value is about doing things cheaper and is normally cost driven

• High value added
  o Is about doing thing better and cheaper
  o Can be achieved by greater efficiency and doing more with less
  o Can be achieved by identifying ingredient synergies
  o Can be created by using multitasking ingredients which can make formulations better, simpler, and cheaper by delivering multi benefits
  o Using green sustainable ingredients
What is Sodium Phytate?

- Phytic acid (Inositol Hexakisphosphate (IP6), or phytate when in salt form) is the principal storage form of phosphorus in many plant tissues, especially bran and seeds.

- Phytic acid is water soluble, highly acidic, and most commercial material is sold as a 50% aqueous solution or a sodium neutralized powder.

- Sodium Phytate can have a maximum of 6 phosphate groups however the average for most commercial material is an average IP of 2-6. The higher the IP is the stronger are the chelating properties.

- Rice bran is an excellent source of Phytic acid with 9.5-14.5% present as Phytin (Calcium/Magnesium Phytate)
Benefits-Chelation

• The iron chelation properties of Phytic acid are similar to EDTA from a PH of 1-10.

• Sodium Phytate is a strong chelating agent that has on average 2-6 phosphate groups. This provides a high chelation potential for polyvalent cations.

• The binding affinity Increases exponentially with the valency of the cation. Phytic acid chelates low levels of iron even In the presence of high calcium concentrations.

• All metal-phytate complexes are very soluble at any pH while metal-phytate complexes containing 3 or more cations are extremely insoluble.
## Chelate Stability Constants of Phytic Acid (log K)

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<th>pH</th>
<th>Mg$^{2+}$</th>
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<td>8.6</td>
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<td>16.8</td>
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<td>8.7</td>
<td>10.6</td>
<td>-</td>
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• Sodium Phytate demonstrated a great affinity for copper ions, with stability constants (logPi) in the same order of magnitude than those of EDTA. In specific conditions, it displayed a copper binding ability better than that of EDTA, making it an attractive candidate for the replacement of EDTA in cosmetic formulations.

• Sodium Phytate (Na6H6- Phytate) (PA3) was significantly more efficient than EDTA in chelating copper at a pH 5.5.
Product Benefits

• Preservative potentiator- Micro organisms need trace metals to survive. Chelants like EDTA salts are commonly used to reduce the preservative levels in formulations. Sodium Phytate should have a similar function.

• Antioxidant activity-Phytic acid can form a unique iron chelate that can suppress iron-catalyzed oxidative reactions.

• Iron chelants can reduce free radical damage in skin.

• An excellent Avobenzone stabilizer. Trace metals like zinc and iron cause discoloration and loss of UV absorption.

• Can act as a PH buffer.

• May help disperse pigments.

• Act as a corrosion inhibitor.
Benefits - Preservative Potentiation

Chelants Boost Preservative Activity

Bacteria membranes aid biocide resistance.
- Chelates deprive membrane of metal ions
- Reduction of biocide in formulations

[Diagram showing the interaction between bacteria, EDTA, EDTA-Ca, and biocide]
Chelants Boost Preservative Activity

GLDA-Dissolvine GL-47S (Akzo Nobel)
Benefits-Preservative Potentiation

Inhibitory (MIC) and biocidal (MBC) activity of Phenylethyl Alcohol/Caprylyl Glycol (in black) plus Sodium Phytate and GLDA-Dissolvine GL-47S (Tetra Sodium Glutamate Diacetate-Akzo Nobel) (in red)

When combined with 0.05% sodium phytate or tetra-sodium glutamate diacetate, blend 1 exhibited a bactericidal action against Gram-positive bacteria at 0.2%, and a complete fungicidal activity against yeasts and molds at 0.3% and 0.4%, respectively.
Skin Benefits-Sodium Phytate

• Moisturizes skin
• Improves skin elasticity
• Normalizes oily skin
• May help reduce pore size
• Helps lighten skin
• May help improve Cellulite
Benefits-Moisturization

Graph showing moisture values after applying skin lotions containing various concentrations of phytic acid over time (in weeks). The graph indicates that higher concentrations of phytic acid lead to increased moisture levels in skin.

2. Moisture values after applying the phytic acid-containing skin lotions at various concentrations. (Provided by Dr. Zhong, Soonqil University)
Benefits - Normalizes Skin Oiliness

A lotion containing .5% Sodium Phytate was tested on oily and dry skin subjects for 4 weeks.

- Sodium Phytate was shown to normalize sebum in both dry and oil skin types.
  - The sebum of the oily skin group dropped from 210 to 125ug/cm² (-40%)
  - The sebum of the dry skin group increased from 30ug/cm² to 105ug/cm² (+250%).
Sodium Phytate May Reduce Skin Pore Size Since Sebum Suppression Correlates With Pore Size

Benefits-Increases Skin Elasticity

• Sodium Phytate shown to increase skin elasticity.
• A lotion containing .5% Sodium Phytate increased the skin elasticity of subjects 20-30 years old by 13% after 4 weeks and 33% in subjects 40-50 years old vs a placebo lotion.
Figure 6: Degree of elasticity increase after applying the 0.5 wt% phytic acid-containing skin lotion for seven weeks. (Provided by Dr. Zhong, Soongsil University)
Benefits - Skin lightening

• Sodium Phytate was shown to have skin lightening effects.
• Lotion formulations containing .5-1.5% reduced the Melanin index of skin from 500 to 470 (6%) after 2 weeks. The placebo lotion remaining unchanged at 500.
• The mechanism of action is believed to be copper chelation. Copper is essential for Tyrosinase activity
• Synergy with other skin lightening actives is possible
Figure 4: Melanin values after applying various concentrations of phytic acid containing skin lotion. (Provided by Dr. Zhong, Soongsil University)
Applications-Skincare

• Toners, astringents
• After shave lotions/gels
• Oil control formulations
• Acne products
• Skin lighteners
• Moisturizing creams and lotions
• Sunscreens (color stabilize Avobenzone)
• Deodorants
Applications-Hair Care

- Shampoos/conditioners
- Body/face washes
- Hair dyes
  - May help stabilize peroxide
  - May improve color fidelity by effective copper chelation
Applications-Color Cosmetics

• Liquid foundations
  o Oil control benefit could help extend the color wear.
  o Sodium phytate could improve the pigment dispersibility
Commercial Products Containing Sodium Phytate
Neutrogena Naturals Acne Spot Treatment

Eye Serum (Zija)

Ingredients; Water, Cucurbita Pepo (Pumpkin) Seed Extract, Sea Water, Moringa oleifera Extract, Sodium Hyaluronate, Glycerin, Arnica Montana Flower Extract, Chrysin, N-Hydroxysuccinimide, Palmitoyl Oligopeptide, Palmitoyl Tetrapeptide-7, Xanthan Gum, Melia Azadirachta Leaf Extract, Carrageenan, Rhizobium Gum, Sodium Phytate, Caprylyl Glycol.
Marigold Chamomile Daycream (Nature Factory)

INGREDIENTS: AQUA, ALOE BARBADENSI* , SIMMONDSIA CHINENSIS OIL, CAPRYLIC/CAPRIC TRIGLYCERIDE, BUTYROSPERMUM PARKII BUTTER*, CALENDULA OFFICINALIS FLOWER EXTRACT, GLYCERYL STEARATE, CETEARYL ALCOHOL, MALTODEXTRIN, GLYCERIN, GLYCERYL OLEATE CITRATE, CHAMOMILLA RECUTITA (MATRICARIA) FLOWER EXTRACT, SORBITOL, LEVULINIC ACID, SODIUM HYALURONATE, XANTHAN GUM, PARFUM, GLYCERYL CAPRYLATE, SODIUM HYDROXIDE, p-ANISIC ACID, TOCOPHEROL, HELIANTHUS ANNUUS SEED OIL, SODIUM PHYTATE, LIMONENE**, BENZYL BENZOATE**, LINALOOL**, CITRONELLOL**, GERANIOL**
Calendula Cream

Natural soothing cream for:
- Dry skin
- Irritated skin
- Sensitive skin

Contains Calendula officinalis

Net Wt. 6 oz (170 g)
Black Spruce Shampoo (Naturopathica)

Ingredients; water/aqua/eau, lauryl glucoside, cocoglucoside, sodium cocoyl glutamate, sodium lauroamphoacetate, betaine, glyceryl laurate, inulin, hydrolyzed sweet almond protein, olea europaea (olive) leaf extract, arginine, PCA glyceryl oleate, sodium PCS, sidum lactate, arginine, aspartic acid, PCA, glycine, alanine, serine, valine, proline, theronine, isoleucine, histidine, phenylalanine, sodium lauroyl glutamate, sodium phytate, chitosan succinamide, Picea mariana (black spruce) needle oil, Pseudotsuga menziesii (fir) needle oil, Citrus paradisi (pink gerapefruit) peel oil, Citrus clementina (clemintine) peel oil, Pelargonium graveolens (geranium) leaf/flower oil, Foeniculum vulgare var. dulce (fennel) seed oil, Mentha spicata (spearmint) leaf oil, Vetiveria zizanoides (vetivert) root oil, gluconolactone, sodium benzoate, citric acid
Nutriganics™ Refreshing Toner (The Body Shop)

Ingredients; Aqua (Solvent/Diluent), Hamamelis Virginiana Water (Astringent), Glycerin (Humectant), Polyglyceryl-4 Caprate (Skin Conditioning Agent), Benzyl Alcohol (Preservative), Sodium Levulinate (Skin Conditioning Agent), Sucrose Laurate (Skin Conditioning Agent), Sodium Benzoate (Preservative), Sodium Anisate (Fragrance Ingredient), Xanthan Gum (Viscosity Modifier), Potassium Sorbate (Preservative), Aloe Barbadensis Leaf Juice (Skin Conditioning Agent), Sodium Phytate (Chelating Agent), Limonene (Fragrance Ingredient), Citral (Fragrance Ingredient), Orbignya Oleifera Seed Oil (Emollient), Linalool (Fragrance Ingredient), Pelargonium Graveolens Flower Oil (Fragrance Ingredient), Citronellol (Fragrance Ingredient), Buddleja Davidii Extract (Skin Conditioning Agent), Thymus Vulgaris Extract (Natural Additive), Geraniol (Fragrance Ingredient), Malva Sylvestris Flower Extract (Natural Additive), Daucus Carota Sativa Seed Oil (Natural Additive), Foeniculum Vulgare Oil (Fragrance/Essential Oil), Cymbopogon Flexuosus Oil (Masking Agent), Alcohol (Solvent/Diluent), Citric Acid (pH Adjuster), Thymus Vulgaris Oil (Fragrance/Essential Oil), Citrus Aurantium Dulcis Peel Oil (Fragrance Component), Rosa Damascena Flower Oil (Fragrance Ingredient).
Nutriganics™ Smoothing Night Cream (The Body Shop)

DNA Ultracustom® Enhanced Repair Serum - $250

Origenere Daily 5 Step Anti Aging Hair Care System

Ingredients

Shampoo

Conditioner
Mad Hippie Vitamin C Serum

Active Ingredients

Vitamin C- Sodium Ascorbyl Phosphate, Clary Sage Salvia sclarea, Grapefruit (Citrus Grandis), Hyaluronic Acid, Amorphophallus (Konjac Root) Powder, Vitamin Etocotrienol, Ferulic Acid, Chamomile Flower Extract Recutita matricaria

Inactive Ingredients

Deionized Water, Alkyl Benzoate, Vegetable Glycerin, Water, Glycerin, Sodium Levulinate, Sodium Anisate, Aloe Barbadensis Leaf, Sodium Phytate, Xanthan Gum, Hydroxyethylcellulose
Origenere Advanced Moisturizing Skin Care Cream

Ingredients
Water, Caprylic / Capric Triglyceride, Glycerin, Simmondsia Chinesis (jojoba) Seed Oil, Cetyl Palmitate, Sorbitan olivate, Cetearly Olivate, Glyceryl Stearate, Carthamus Tinctorius (Safflower) Seed Oil, Malva Sylvestris (Mallow) Extract, Tocopherol, Limnanthes Alba (Meadowfoam) Seed Oil, Ceratonia Siliqua (Carob) Fruit Extract, Butyrospermum Parkii (Shea Butter) Extract, Olea Europaea (Olive) Oil Unsaponifiables, Helianthus Annuus (Sunflower) Seed Oil, Ascorbyl Palmitate, Stearic Acid, Cetearyl Alcohol, Sodium Dehydroacetate, Ethylhexylglycerin, Xanthan Gum, Iecithin, Citric Acid, Sodium Benzoate, Sodium Phytate, Phenoxyethanol
Glow by Dr. Brandt Ruby Crystal Retinol Hydracreme

INGREDIENTS; WATER (AQUA), CAPRYLIC /CAPRIC TRIGLYCERIDE, BUTYLENE GLYCOL DICAPRYLATE DICAPRATE, TRIHEPTANOIN, GLYCERIN, GLYCERYL STEARATE CITRATE, ISOAMYL LAURATE, CI77891, SHEA BUTTER ESTERS, CYCLOPENTASILOXANE, SODIUM ACRYLATES COPOLYMER, DIMETHICONOL, RUBY POWDER, POLYGLYCERYL-3 STEARATE, CALCIUM ALUMINUM BOROSILICATE, LECITHIN, BETAIN, HYDROGENATED LECITHIN, POLYGLYCERYL-10 LAURATE, SYNTHETIC FLUORPHLOGOPITE, GLYCERYL STEARATE, BEHENYL ALCOHOL, CAPRYLYL GLYCOL, CI77491, CITRUS NOBILIS OIL, TITANIUM DIOXIDE, SODIUM BENZOATE, POLYGLYCERYL-3-PALMITATE, HYDROGENATED POLYISOBUTENE, MASLINIC ACID, MICA, TRIETHOXYPARLYLSILANE, ALLANTOIN, CHLORPHENESIN, DIMETHICONE, HONEY, PECTIN, PHOSPHOLIPIDS, RETINOL, POLYGLYCERYL-10 STEARATE, HELIANTUS ANNUUS (SUNFLOWER) SEED OIL, GLYCERYL CAPRYLATE, ALUMINA, SODIUM PHYTATE, GLYCINE SOYA STEROLS, PHENYLPROPOANOL, VINYL DIMETHICONE CROSPPOLYMER, SILICA
Alcina Sensitive Facial Cream Light For Sensitive Skin

INGREDIENTS; AQUA, GLYCERIN, OCTYLDODECANOL, CETYL ALCOHOL, GLYCERYL STEARATE, SQUALANE, CETEARYL ETHYLHEXANOATE, SIMMONDSIA CHINENSIS SEED OIL, BUTYLENE GLYCOL, TOCOPHERYL ACETATE, PEG-40 STEARATE, PERSEA GRATISSIMA OIL, PARFUM, PHENOXYETHANOL, DIMETHICONE, PHYTOSTEROLS, SORBITAN TRISTEARATE, OLEA EUROPAEA FRUIT OIL, METHYLPARABEN, ETHYLPARABEN, BENZYL SALICYLATE, BUTYLPHENYL METHYLPROPIONAL, SODIUM PHYTATE, PROPYLPARABEN, AVENA SATIVA KERNEL EXTRACT, ALPHA-ISOMETHYL IONONE, HYDROXYISOHEXYL 3-CYCLOHEXENE CARBOXALDEHYDE, SORBITAN OLEATE, ASCORBYL PALMITATE, CI 16035
Für empfindliche Haut
Sensitiv Gesichtscreme light
Beruhigt gereizte Haut
Reduziert Rötungen

ALCINA
Origener Daily 5 Step Anti Aging Hair Care System

Ingredients

Hair'Scalp Treatment

Hair Styling Cream
Aptiva Cleansing Gel for Oily/Combination Skin

Ingredients; Aqua, Cocamidopropyl Betaine, Sodium Cocopolyglucose Tartrate, Sodium Lauroyl Sarcosinate, PEG-150 Distearate, Sorbitol, Polysorbate 20, Bisabolol, Ammonium Glycyrrhizate, Glycerin, Propolis, Citrus Aurantifolia Fruit Extract, Panthenol, Capryloyl Glycine, Allantoin, Camelia Sinensis Leaf" , Citrus Medica Limonum Peel Oil", Melaleuca Alternifolia Oil", Juniperus Communis Oil, Butylene Glycol, Parfum, Citric Acid, Dehydroacetic Acid, Sodium Phytate, Sodium Hydroxide, Benzyl Alcohol, Alcohol, Limonene, Hexyl Cinnamal, Linalool
Sibu Beauty Sea Buckthorn Hydrating Serum

Ingredients; water, glycerin, SD alcohol 40-B, betaine, sea buckthorn fruit extract (hippophae rhamnoides), phenethyl alcohol, sea buckthorn seed oil (hippophae rhamnoides), algae extract, artemisia vulgaris extract, dipotassium glycyrrhizate, sodium hyaluronate, tocopherol, retinyl palmitate, polyglyceryl-10 laurate, xanthan gum, sclerotium gum, sodium levuiiinate, sodium anisate, sodium phytate, fragrance {from orange and lemon essential oils}
San Medica Dermafactor
Advanced Acne Kit For Sensitive Skin

Skin Revitalizing Facial Toner: Water (Aqua), Butylene Glycol, Glycerin, Betaine, Hydrolyzed Ceratonia Siliqua Seed Extract, Aloe Barbadensis Leaf Juice, Boerhavia Diffusa Root Extract, Allantoin, Citrus Grandis (Grapefruit) Peel Oil, Sodium Phytate, Saccharomyces/Manganese Ferment, Ergothioneine, Saccharomyces/Copper Ferment, Butyl Avacadate, Saccharomyces/Zinc Ferment, Ethylhexylglycerin, Lysophosphatidic Acid, Polyglyceryl-10 Laurate, PHenoxyethanol, Caprylyl Glycol, Hexylene Glycol, Retinyl Palmitate, Lecithin, Lysolecithin
THE FIRST PROFESSIONAL STRENGTH
ACNE KIT
FOR SENSITIVE SKIN

EACH KIT CONTAINS:

STEP 1: ACNE-SPECIFIC TREATMENT
STEP 2: DEEP CLEANSING FACIAL WASH
STEP 3: SKIN RE-VITALIZING FACIAL TONER

dermofactor
Sodium Phytate Specifications

Specification—Sodium Phytate Powder

Product Description: Rice bran extract, Phytic acid sodium salt, white powder

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<th>Specification</th>
<th>Requirement</th>
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<tr>
<td>Sodium</td>
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References

  18. 433-440.
References

• Sakai Kotaro, Food & Development (Shokuhin to Kaihatsu), 27(8), 19-23. (1992)(in Japanese)
• Tsuno Rice Fine Chemicals, Phytic Acid brochure
• Jin-Joo Hue, Lan Li Yea, Eun Lee Ki-Nam, Lee Sang-Yoon, Nam Young-Won Yun, Antibacterial Activity of Sodium Phytate and Sodium Phosphates Against Escherichia coli O157:H7 in Meats, Journal of Food Hygiene and Safety 01/2007; 22(1).
Patents

• Moisturizing Composition US 20150080346 (L’Oreal-3/19/15)